

REMARKS

Claims 1-11 are all the claims pending in the application. By this Amendment, Applicant amends claims 5, 8, and 10 to cure minor informalities. The editorial amendments to claims 5, 8, and 10 do not narrow the literal scope of the claims and thus do not implicate an estoppel in the application of the doctrine of equivalents. The amendments to claims 5, 8, and 10 were not made for reasons of patentability.

I. Preliminary Matters

The Examiner has indicated that the certified copy of the priority document has not been received. However, upon review of the Image File Wrapper on the USPTO PAIR Website, it is clear that the priority document has been received. The USPTO has improperly labeled it as a foreign reference in the Image File Wrapper and not as the certified copy of the priority document. **The Examiner is respectfully requested to acknowledge receipt of the certified copy of the priority document (EP 02292722.2 dated October 31, 2002) filed with the application on September 29, 2003 and to fix the Image File Wrapper so as to properly label the scanned in document as a foreign priority document and not a foreign reference.**

II. Claim Objections

Claims 8 and 10 are objected to because of minor informalities. It is respectfully requested that the Examiner withdraw these objections of claims 8 and 10 in view of the self-explanatory claim amendments being made herein.

III. Prior Art Rejections

Claims 1-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,229,997 to Hirata (hereinafter “Hirata”) in view of U.S. Patent No. 6,606,343 to Zeira (hereinafter “Zeira”). Applicant respectfully traverses these rejections in view of the following comments.

i. Legal Standard

The initial burden of establishing that a claimed invention is *prima facie* obvious rests on the USPTO. *In re Rikckaert*, 9 F.3d 1531, 1532 (Fed. Cir. 1993). To make its *prima facie* case of obviousness, the USPTO must satisfy three requirements:

- a) The prior art reference or combination of references must teach or suggest all the limitations of the claims. *In re Vaeck*, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991); *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970).
- b) The proposed modification of the prior art must have had a reasonable expectation of success, and that determined from the vantage point of the artisan at the time the invention was made. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209 (Fed. Cir. 1991).
- c) The prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated an artisan to modify a reference or to combine references. *In re Thrif*, 298 F.3d 1357, 1363 (Fed. Cir. 2002).

Applicant respectfully submits that in the present case, the Office Action did not meet the first and third requirements, as discussed below.

ii. Claimed Invention

In general, the present invention relates to improving forward error correction that originates during transmission of signals. Conventional FEC decoders compensate for transmission errors by having parity data transmitted along with the original data and by using the parity data to recreate any corrupted or lost packets of the original data. The FEC techniques, can properly correct only a fixed maximum number of symbols in a codeword. In conventional FEC techniques, when the number of faulty signals is higher than the fixed maximum, the errors are wrongly corrected and additional errors are also introduced into the original signal. In the present invention, however, introducing additional errors into the original transmitted signal, when the number of faulty signals is higher than the fixed maximum, is prevented. That is, the FEC decoder detects a number of faulty symbols in the received original signal and when the number exceed a predetermined threshold (fixed maximum), the error correction of the received original signal does not take place. Further, various thresholds can be set, for example, for different iterations and for columns versus rows checking of the frame containing data of the original signal.

In other words, the only independent claims 1 and 5 recite, in some variation, setting at least one error threshold, and performing a correction of the original signal only when the number of counted errors is lower than the threshold.

iii. Prior Art References

The prior art references cited by the Examiner do not disclose or suggest correcting the errors in the original signal only when the number of counted errors is lower than the threshold.

Hirata discloses a technique for determining the proper timing at which to execute a decoding process. In Hirata, the error rate of a decoded version of the convolutional code is determined, and an out-of-FEC-sync signal is produced when the error rate is higher than a threshold value. Unique words are detected from the decoded signal and counted during a prescribed time interval to produce an out-of-frame-sync signal when the count falls below a threshold. The frequency of the local carrier is swept in the presence of the out-of-FEC-sync signal. When the signal ceases to exist, a timeout period is set, and the local carrier frequency is swept again when the timeout period expires during the presence of the out-of-frame-sync signal (*see* Abstract and col. 2, lines 18 to 43).

Specifically, in Hirata, the receiver has a decoder for decoding the signals to produce an error corrected bit sequence, which is then applied to a unique word detector 11 in which it is checked against the stored unique bit sequence to detect the transmitted unique word. A unique word separator is provided for receiving an error-corrected bit sequence and to remove unique words so as to obtain only the transmitted signal (Fig. 1; col. 3, lines 3 to 30).

Further, in Hirata, a FEC sync detector is provided for receiving the error correction signal from the decoder to determine whether the decoding process is performed at a proper timing. The FEC sync detector includes an integrator to which the error correction signal is applied, the output of which increases when the error rate of the decoded signal increases and a comparator that compares output of the integrator with a predetermined threshold. Also, a frame sync detector is provided that monitors output of the unique word detector to determine whether the local carriers are in- or out-of-sync with the frame timing of the transmitted carrier (*i.e.*, when the count of the detected unique words is below a threshold value, an out-of-frame-sync

signal is produced by the frame sync detector). Also, a frequency sweep controller is provided to control the frequency of the local carriers of the demodulator (Figs. 1 and 2; col. 3, lines 31 to 67).

Zeira discloses correcting the transmission power of the base station (transmitting device) based on the error rate in the receiving device. Specifically, Zeira discloses prior to transmission of the communication, the transmission station error encoding the data signal of the communication using techniques such as CRC followed by FEC (although other types of error encoding schemes may be used). The receiving station receives various signals from the transmitting station. The receiving station includes data estimation device which recovers data from the channel by estimating soft symbols using channel information. Using the produced soft symbols, an error detection device of the receiving station detects errors in the soft symbols and a processor analyzes the detected error and determines an error rate for the received communication. Based on the determined error rate, the processor determines the target level and sends the adjustment (if any is necessary) to the transmitting station. In Zeira, the amount of adjustment necessary may be determined using upper and lower thresholds. As a result, high error rates are improved quickly and lower error rates are adjusted slowly (Fig. 4; col. 2, line 64 to col. 3, line 51).

Zeira further discloses CRC and FEC encoding are performed *i.e.*, each block is checked for an error, and each time an error is found, the counter is incremented. Once the counter exceeds a predetermined threshold, a target adjustment is sent to increase the target level. Similarly, if the number of CRC frames encountered exceeds a predetermined limit *e.g.*, 1000 blocks, the value of the counter is compared to the lower threshold. If the number of counted

errors is below lower threshold, a target adjustment signal is sent decreasing the target power level (col. 3, line 52 to col. 4, line 8).

iv. Examiner's Position

The Examiner acknowledges that Hirata does not disclose the above-quoted unique features of these independent claims. The Examiner, however, alleges that the newly found reference, Zeira cure the deficient disclosure of Hirata (*see* page 3 of the Office Action).

v. Applicant's Position

Applicant respectfully submits that both Hirata and Zeira taken alone or in any conceivable combinations fail to disclose or suggest the unique features of claims 1 and 5, mentioned above.

Hirata fails to disclose performing a correction of the original signal only when the number of counted errors is lower than the threshold. In Hirata, when output from the integrator is above a threshold, the frequency of the local carriers of the demodulator is swept. That is, Hirata deals with synchronizing the local carriers with the frame timing of the transmitted carriers and not with the correction of the original signal (col. 3, line 54 to col. 4, line 8). In Hirata, the correction of the original signal is performed by the conventional decoder, which corrects the original signal and based on the resulting correction, the proper timing of the decoding process is determined (col. 3, lines 15 to 22). Hirata corrects the timing of the decoding process based on the results of the comparison. Hirata does not disclose correcting the actual original signal only when the number of counted errors is lower than a threshold, as set forth in some variation in the independent claims 1 and 5.

Similarly, Zeira only discloses obtaining target transmission power level based on the number of errors and not correcting the original signal (col. 3, line 52 to col. 4, line 8). In Zeira, if the number of counted errors is below lower threshold, a target adjustment signal is sent decreasing the target level of the transmitting station. In other words, when the number of errors is below the threshold, a target adjustment signal for transmission power level is calculated. There is no disclosure or suggestion of correcting the original signal based on the number of errors. Furthermore, in Zeira, the target adjustment signal is sent when the number of errors is above a first threshold or below a second threshold. There is no disclosure or suggest of correcting the original signal only when the number of counted errors is below the threshold. That is, in Zeira, the target adjustment signal is calculated when the number of errors are above a certain threshold and not only when the number of counted errors is below a threshold.

In short, the combined disclosure of Hirata and Zeira, taken alone or in any conceivable combination, do not disclose or suggest the unique features of claims 1 and 5, mentioned above. That is, both references fail to disclose or suggest performing a correction of the original signal only when the number of counted errors is lower than the threshold. Accordingly, the USPTO failed to establish the first requirement in establishing a *prima facie* case of obviousness.

Furthermore, one of ordinary skill in the art would not have been motivated to combine the references in the manner suggested by the Examiner. The motivation, suggestion or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, the nature of a problem to be solved. *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999). Alternatively, the motivation may be implicit from the prior art as a whole, rather than expressly stated. *Id.* Regardless if the USPTO relies on an express or an implicit showing of

motivation, the USPTO is obligated to provide particular findings related to its conclusion, and those findings must be clear and particular.

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. *See In re Kotzab*, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000) (*citing In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999)). Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one “to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher.” *Kotzab*, 55 USPQ2d at 1316 (*quoting W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 313 (Fed. Cir. 1983)).

“Although the suggestion to combine references may flow from the nature of the problem, ‘defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness.’” *Exolochem, Inc. v. Southern California Edison Co.*, 2000 U.S. App. LEXIS 22681, *28 (Fed. Cir. 2000) (*citing Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 880, 45 USPQ2d 1977, 1981 (Fed. Cir. 1998)). A particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.

The Examiner contends that one of ordinary skill in the art would have been motivated to combine the references “to maintain both the signal quality of communication and low transmission power levels” (*see* page 3 of the Office Action). The Office Action’s general

conclusory statement does not satisfy the requirement of providing a clear and particular motivation for the proposed combination. Applicant respectfully submits that Hirata and Zeira address very different problems. Hirata discloses determining the right timing for the decoding process and Zeira discloses determining proper adjustment level for the transmission power. One of ordinary skill in the art would not have and could not have used the threshold of Zeira with the alleged comparator of Hirata (*see* pages 2-3 of the Office Action). That is, using a threshold for the transmission power level adjustment as disclosed in Zeira with the alleged comparator of Hirata for the proper timing of the decoding process results in an unworkable combination. In short, a threshold for the counted number of errors during the decoding process cannot be applied to obtain the proper timing of the decoding process. It is Applicant's position that one of ordinary skill in the art would not have been motivated and could not have combined the references in the manner suggested by the Examiner. Furthermore, one of ordinary skill in the art would not have combined these references but to somehow meet the unique features of the claimed invention. Accordingly, the Office Action failed to establish the third requirement in establishing a *prima facie* case of obviousness.

For at least these exemplary reasons, claims 1 and 5 are patentable over the combined disclosure of Hirata and Zeira. Accordingly, Applicant respectfully requests the Examiner to withdraw this rejection of claims 1 and 5 and their dependent claims 2-4, 6, and 7.

In addition, dependent claim 2 recites: "when the number of counted errors is higher than the threshold, the correction of the original signal is performed in different operation if a recursive decoder is used." The Examiner contends that Hirata discloses the unique features of claim 2 (*see* page 3 of the Office Action). In Hirata, there is no disclosure of correcting the

original signal in a different operation. Moreover, there is no disclosure of a recursive decoder. Zeira does not cure the above identified deficiencies of Hirata. For at least these additional exemplary reasons, dependent claim 2 is patentable over Hirata and Zeira.

Dependent claim 3 recites: “the setting an error threshold comprises setting a first error threshold for checking lines of the original signal and a second error threshold for checking columns of the original signal.” The Examiner contends that col. 3, lines 31 to 52 of Hirata disclose these unique features of claim 3 (*see* page 3 of the Office Action). As explained above, in Hirata, there is no disclosure of setting the threshold. Moreover, there is no disclosure of setting one threshold for checking lines and another threshold for checking columns of the original signal. Zeira only discloses having a threshold for a number of counted errors and having a threshold for a number of frames and fails to disclose or suggest having a threshold for the number of countered errors in a line and another threshold for a number of counted errors in a column. In short, Zeira does not cure the deficient disclosure of Hirata. For at least these additional exemplary reasons, dependent claim 3 is patentable over Hirata in view of Zeira.

In addition, dependent claim 9 recites “when the number of counted errors is higher than or equal to the error threshold, the decoder does not perform the correction of the original signal and wherein said correction comprises correcting faulty symbols in the original signal.” The Office Action simply contends that claim 9 recites substantively the limitations of claim 5 and that the features of claim 9 have been addressed with respect to claim 5 (*see* page 4 of the Office Action). Applicant respectfully disagrees. Applicant respectfully submits that Hirata and Zeira do not disclose or suggest that the decoder does not correct the original signal when the number of errors exceeds a threshold. On the contrary, in Hirata, the threshold is used to determine

proper timing for the decoding process and in Zeira, an adjustment power level is calculated based on the threshold. That is, both references taken alone or in any conceivable combination fail to disclose or suggest the decoder not correcting the original signal when the number of errors is above the threshold. For at least these additional exemplary reasons, dependent claim 9 is patentable over Hirata in view of Zeira.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


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